Telemedicine in the making: Moca source code released

February 18 2010

Moca, an MIT student organization, today announced the release of the Moca source code, a set of foundational building blocks for telemedicine and mHealth applications that use wireless networks to connect rural healthcare workers to urban-area specialists.

Around the world, millions of people in rural areas lack access to medical specialists, such as a radiologist to read an ultrasound or a cardiologist to evaluate a patient with rheumatic heart disease. With the rapid expansion of cellular networks and substantial advancements in smartphone technologies, it is now possible — and affordable — to

transmit [patient data](#) digitally from remote areas to specialists in urban areas, receive real-time feedback, and capture that consultation in a database. This enables rural healthcare workers to break down distance barriers to treatment and provides unprecedented opportunities for underserved populations to receive better healthcare.

The Moca [source code](#), which can be downloaded for free at www.mocamobile.org , enables the building blocks that allow rural healthcare workers to use smartphones to record patient data and transmit the files to specialists for diagnoses and treatment suggestions.

"The release of the Moca source code is an important contribution to the nascent health care [open source](#) movement by expanding the functionality of current available data management software beyond SMS texting," said MIT researcher and Moca team member Leo Anthony Celi. "We hope it will become a valuable resource for the medical and public health communities to expand care to underserved populations," he added. Oxford University Lecturer Gari Clifford, also a Moca team member, welcomed the release saying: "The Moca team approaches this project mindful that a strong telemedicine solution needs to be made customizable and open-source in order to facilitate the dissemination of best practices in health care delivery."

Following the organization's mission to create an open, free telemedicine platform, Moca team members wrote the source code for the Google Android operating system, which allows users to download, customize, and implement the Moca platform for their use at no cost. Further, Moca is fully compatible with OpenMRS, an open source medical record system, and is hardware agnostic to allow users to build on their current technological infrastructure.

"Moca is a wonderful example of how an interdisciplinary team can apply information technology expertise to the enormous problem of

health in the poorest countries in the world," said David Aylward, Executive Director of the mHealth Alliance, a global non-profit founded by the Rockefeller, United Nations and Vodafone Foundations, and the US President's Emergency Program for Africa Relief (PEPFAR). "We are grateful for this very important contribution," he added.

The Moca end-to-end solution includes:

• Google Android Client Application: The interface where a health care worker can document patient information through text, images, and GPS location, and upload the medical data to OpenMRS. Any user is welcome to use the application on their own Android smartphone and view their patients' cases on Moca's OpenMRS server.

• Moca Dispatch Server: The intermediary layer between Moca's Android client and the Electronic Medical Record (EMR) system. The Moca Dispatch Server also provides the flexibility to extend Moca to other mobile devices and medical record system back-ends.

• OpenMRS Moca Module: An OpenMRS plug-in that allows urban-area specialists to receive patient cases uploaded from a smartphone to the Moca Dispatch Server. The Moca Module creates a queue of patient cases in need of review and allows for text or e-mail messaging for specialists to send instructions to healthcare workers.

• OpenMRS Flash Media Viewer Module: Moca's open source contribution to the OpenMRS platform. The Media Viewer allows healthcare providers to view and manipulate patient images with contrast, zoom, brightness, and sharpness, in addition to playing audio and video media files. The Media Viewer is modular in design and can be used outside of Moca's remote medical diagnostics applications.

• Documentation: Step-by-step instructions on how to demo the system

and setup a development environment.

• Sample Questionnaires: Disease-targeted patient assessment questionnaires developed by ClickDiagnostics in collaboration with a network of doctors through extensive pilots in Africa and Asia. These assessment questionnaires showcase the potential impact of Moca for field health professionals.

The Moca team encourages health organizations to work with this platform and to customize a solution for their own development projects. As IT integrations into healthcare present immense challenges such as workflow re-design and worker acceptance, the Moca student organization provides assistance for deployment implementation and assessment. Healthcare organizations are encouraged to contact Moca at questions(at)mocamobile.org to discuss potential collaborations. Technical questions about the software can be directed to the online forum: moca-users(at)googlegroups.com.

The release of the source code represents a major milestone for Moca's development. Moca began as a project within MIT's NextLab program, and has since grown to a diverse student organization hosted at the MIT Engineering Systems Division. Team members include student and faculty volunteers from MIT, Harvard and other universities worldwide. Further, the advisory of field experts from a wide array of partners, both commercial corporations and NGOs made the maturity of the current source code possible.

Deployment plans for the Moca organization are ambitious. The team is in discussions to implement the Moca platform in the Philippines, U.S., India, and Mexico. Technical plans include the creation of an improved customization platform and the expansion of data input functionality to include video, such as ultrasound and echocardiogram, and audio, such as heart and lung sounds. Moca is also planning to expand compatibility

with plug-in medical devices for ultrasound and electrocardiographic review.

Provided by Massachusetts Institute of Technology